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## CLAIMS

I claim:

- 10           1. A system for automated temperature measurement, comprising:  
a programmable logic controller;  
a temperature measurement diode;  
an analog-to-digital converter coupled to the diode and the programmable logic  
controller;
- 15           a current source coupled to the diode and configured to generate a first current  
and a second current different from said first current; and  
a processor coupled to the current source and to the analog-to-digital converter,  
said processor configured to control the current source such that the current source  
sequentially applies the first current to the diode at a first point in time and applies the  
20           second current to the diode at a second point in time, configured to obtain a first voltage  
across the diode measured when the first current is applied to the diode and to obtain a  
second voltage across the diode measured when the second current is applied to the  
diode, and configured to determine the temperature proximate the diode based on the first  
and second voltages.
- 25           2. The system of claim 1, wherein the diode comprises:  
a first end forming a collector; and  
means for connecting said first end to the current source and to said analog-to-  
digital converter.
- 30           3. The system of claim 1, wherein the diode comprises:  
a second end forming a base emitter; and  
means for connecting the second end to a ground.
4. The system of claim 1, wherein said second current is a fixed ratio of said first  
current.
- 35           5. The system of claim 1, wherein the analog-to-digital converter is configured to  
receive the first voltage and the second voltage, configured to convert the first voltage

5 and the second voltage from analog measurements to digital measurements of the first and second voltage, and configured to transmit the digital measurements of the first voltage and the second voltage to the processor.

6. The system of claim 1, wherein said current source comprises a first current source configured to generate the first current and a second current source configured to  
10 generate the second current.

7. The system of claim 1, wherein the programmable logic controller comprises the processor.

8. The system of claim 7, wherein the programmable logic controller comprises an I/O module coupled to the A/D converter and to the current source.

15 9. The system of claim 1, wherein the processor is external to the programmable logic controller.

10. The system of claim 9, wherein the system further comprises an I/O module external to the programmable logic controller and coupled to the A/D converter and to the current source.

20 11. The system of claim 10, wherein the I/O module comprises the processor.

12. The system of claim 1, further comprising a temperature unit, said temperature unit comprising the diode, the A/D converter, and the current source.

13. The system of claim 12, wherein the temperature unit comprises the processor.

25 14. The system of claim 1, wherein the system further comprises an I/O module external to the programmable logic controller and comprising the A/D converter and the current source.

15. A method for automated temperature measurement in a system comprising a programmable logic controller, a temperature measurement diode, an analog-to-digital  
30 converter coupled to the diode and the programmable logic controller, and a current source coupled to the diode, comprising:

controlling the current source such that the current source sequentially applies a first current to the diode at a first point in time and applies a second current to the diode at a second point in time;

5           measuring a first voltage across the diode when the first current is applied to the  
diode;  
          measuring a second voltage across the diode when the second current is applied to  
the diode; and  
          determining the temperature proximate the diode based on the first and second  
10   voltages.

          16. A system for automated temperature measurement, comprising:  
          a programmable logic controller;  
          a current source;  
          means for controlling the current source such that the current source sequentially  
15   applies a first current to the diode at a first point in time and applies a second current to  
the diode at a second point in time, said means for controlling the current source being  
coupled to the programmable logic controller and the current source;  
          means for measuring a first voltage across the diode when the first current is  
applied to the diode and for measuring a second voltage across the diode when the second  
20   current is applied to the diode; and  
          means for determining the temperature proximate the diode based on the first and  
second voltages.

          17. The system of claim 16, wherein the programmable logic controller  
comprises:

25           the means for controlling the current source; and  
          the means for determining the temperature.

          18. The system of claim 17, wherein the programmable logic controller  
comprises an I/O module coupled to the current source.

          19. The system of claim 16, wherein the means for controlling the current source  
30   and the means for determining the temperature are external to the programmable logic  
controller.

          20. The system of claim 19, wherein the system further comprises an I/O module  
external to the programmable logic controller and coupled to the current source.

          21. The system of claim 20, wherein the I/O module comprises the means for  
35   determining the temperature.